

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A receiving apparatus using a CDMA method for receiving signals by N receiving antennas (N is a positive integer), the signals being transmitted by M transmitting antennas (M is a positive integer), comprising:

serially coupled multipath receiving signal demodulating units for primary demodulation of the signals received by the receiving antennas, for estimating the signals transmitted from the transmitting antennas, and for obtaining a received signal of each path of the receiving antennas in a multipath environment based on the estimated signals;

serially coupled multipath interference canceling units for deducting the obtained signals received through the paths other than a target path from the signals received by the receiving antennas to obtain multipath interference cancelled signals; and

a demodulating unit for secondary demodulation of the multipath interference cancelled signals,

wherein the multipath receiving signal demodulating units and the multipath interference canceling units are serially arranged in stages, a receiving signal received at each of the receiving antennas is directly inputted to all the serially coupled corresponding multipath interference canceling units without having passed through any of the other multipath interference canceling units, each of the stages other than the first stage updates a channel coefficient estimated based on a known pilot signal transmitted from the M transmitting antennas using a multipath interference cancelled signal provided by a multipath interference canceling unit in an upper stage.

Claim 2 (Original): The receiving apparatus as claimed in claim 1, wherein
the multipath receiving signal demodulating units carry out the primary demodulation
using a minimum mean square error (MMSE) method.

Claim 3 (Original): The receiving apparatus as claimed in claim 1, wherein
the multipath receiving signal demodulating units carry out the primary demodulation
using a maximum likelihood detection (MLD) method.

Claim 4 (Original): The receiving apparatus as claimed in claim 1, wherein
the multipath receiving signal demodulating units carry out the primary demodulation
using a maximum likelihood detection method using QR factorization on a block of a
plurality of the paths.

Claim 5 (Original): The receiving apparatus as claimed in claim 1, wherein
the multipath receiving signal demodulating units carry out the primary demodulation
using a maximum likelihood detection method using QR factorization on each of the paths.

Claim 6 (Previously Presented): The receiving apparatus as claimed in claim 2,
wherein
the multipath receiving signal demodulating units control an amplitude of the signal
received, based on a probability of correctness of a transmission symbol sequence estimated
using the minimum mean square error (MMSE) method.

Claim 7 (Original): The receiving apparatus as claimed in claim 2, wherein
the multipath receiving signal demodulating units estimate a channel coefficient using
a known pilot signal transmitted from the M transmitting antennas.

Claims 8-9 (Canceled).

Claim 10 (Original): The receiving apparatus as claimed in claim 1, wherein
the demodulating unit performs the secondary demodulation using a maximum
likelihood detection method.

Claim 11 (Original): The receiving apparatus as claimed in claim 1, wherein
the demodulating unit performs the secondary demodulation using a maximum
likelihood detection method using QR factorization on a block of a plurality of the paths.

Claim 12 (Original): The receiving apparatus as claimed in claim 1, wherein
the demodulating unit performs the secondary demodulation using a maximum
likelihood detection method using QR factorization on each of the paths.

Claim 13 (Original): The receiving apparatus as claimed in claim 1, wherein
when the signals transmitted from the M transmitting antennas are code-multiplexed
signals,
the multipath receiving signal demodulating units perform the primary demodulation
of the signals received by the corresponding receiving antennas, and obtain the signals of the
corresponding paths for all the receiving antennas for all spreading signals,

the multipath interference canceling units deduct the obtained signals corresponding to all the spreading signals received through the paths other than a target path from the signals received by the receiving antennas to obtain multipath interference cancelled signals, and

the demodulating unit performs the secondary demodulation of the multipath interference cancelled signals for each of the spreading signals.

Claim 14 (Currently Amended): A receiving method of a receiving apparatus for receiving a plurality of signals using a CDMA method, the signals being transmitted from M transmitting antennas (M is a positive integer) and received by N receiving antennas (N is a positive integer), comprising:

receiving the signal received by each of the receiving antennas;

estimating, at a plurality of serially coupled multipath receiving signal demodulating units, the signal transmitted from each of the transmitting antennas using a predetermined algorithm;

multiplying, at the serially coupled multipath receiving signal demodulating units, the estimated transmitted signal and a channel coefficient estimated based on a known pilot signal, and obtaining the received signal of each path for each of the receiving antennas in a multipath environment;

deducting, at a plurality of serially coupled multipath interference canceling units, the obtained received signals of the paths other than a target path from the signal received by each of the receiving antennas; and

demodulating the signals that are obtained by the step of deducting,

wherein the multipath receiving signal demodulating units and the multipath interference canceling units are serially arranged in stages, a receiving signal received at each

of the receiving antennas is directly inputted to all the serially coupled corresponding multipath interference canceling units without having passed through any of the other multipath interference canceling units, each of the stages other than the first stage updates a channel coefficient estimated based on a known pilot signal transmitted from the M transmitting antennas using a multipath interference cancelled signal provided by a multipath interference canceling unit in an upper stage.

Claim 15 (Original): A radio communications system, comprising:
the receiving apparatus as claimed in claim 1; and
a transmitting apparatus including the M transmitting antennas (M is a positive integer) for transmitting a CDMA signal from each of the transmitting antennas.